portion **602**. Each wedge shaped element **600** that includes the anchored portion **602** and movable wedge section **604** may be secured in the device in a fixed location below the flexible skin structure **320** and above a sliding ramp or movable ramp structure **606**. As the movable ramp structure **606** is moved horizontally, the pivotable wedge shaped elements **604** are moved by ramp sections **608** of the movable ramp structure **606** such that they come in contact with desired portions of the flexible skin structure **320**. Among other advantages, this structure may provide reduced friction and wear between sliding elements and tabs molded into the flexible skin structure. Other advantages may be recognized by those of ordinary skill in the art. However, any desired flexible skin structure and ramp structure may be employed. Movement of the ramp structure causes movement of the wedge shaped elements and movement of the flexible skin structure to provide a change in tactile configuration. As also shown, the substrate anchored portion **602** serves as a substrate for the flexible skin structure **320** and is interposed between the flexible skin structure **320** and the movable ramp structure **606**. A touch sensor **324** is supported by the substrate and located between at least two movable portions (e.g., **322**) of the flexible skin structure. It will be recognized that the touch sensors **324** may be suitably located at any location depending upon the desired functionality of the portable electronic device.

[0053] FIGS. **8**, **9** and **10** illustrate an example of a shape memory alloy actuation structure **800** and a corresponding flexible skin structure **320** that moves in response to movement of a metal alloy **812** in the shape memory alloy actuation structure **800** in accordance with one embodiment. FIG. **8** is a top view illustrating a plurality of pivoting elements **802-808** that are pivotally connected with a base **810**. The plurality of pivoting elements **802-808** pivot along pivot points generally indicated at **814** caused by, in this example, the lengthening and shortening of a shape memory alloy **812** such as nitinol wire, or any other suitable shape memory alloy. In one example, a single segment of shape memory alloy **812** may be connected to the pivoting elements **802-808** and to the base portion as diagrammatically illustrated as connection points **816**. It will be recognized, however, that any suitable connection location or connection technique may be used to affix one or more shape memory alloy segments to one or more pivoting elements. It will also be recognized that the shape of the pivoting elements and their length and material may vary depending upon the particular application. One example for illustration purposes only, and not limitation, may include using polypropylene or nylon. Also the hinged area or pivot location **814** may be thinned if desired.

[0054] As shown, a voltage or current source **820** is selectively applied by opening and closing switch **822** by suitable control logic **200**. In addition to, or alternatively, a separate segment of shape memory alloy may be used independently for each pivot element **802-808** so that each pivot element may be controlled independently by the control logic. However, for purposes of explanation, the discussion will assume that a single shape memory alloy element is used to move all the pivoting elements **802-808** at the same time. In any embodiment, when current is passed through the shape memory alloy, it shortens, causing the pivotal elements **802-808** to push up against the flexible skin. As such, the base **810** may be suitably mounted horizontally, for example, underneath the flexible skin structure and positioned so that the pivoting elements **802-808** suitably align with desired portions of the flexible skin structure to move (e.g., raise and lower) portions of the flexible skin structure. As noted, different or separate wires may be attached to different pivoting elements in order to provide selectively as to which texture elements are actuated. In this example, the controllable skin texture surface includes a skin texture actuation structure that includes a plurality of pivoting elements **802-808** having a shape memory alloy (whether single or multiple elements thereof) coupled to the skin texture to effect movement of the pivoting elements against the flexible skin structure which moves in response to movement of the plurality of pivoting elements. The movement of the pivoting elements change a tactile configuration of a portion of the controllable skin texture surface that is contacted by the pivoting elements. The control logic **200** activates, for example, switch **822** or a plurality of other switches to provide suitable current to control movement of the pivoting elements by applying current to the shape memory alloy element **812**. If desired, a voltage source or current source may be provided for each individual pivoting element and may be selectively switched in/out to control the movement of each pivoting element as desired. Any other suitable configuration may be also be employed. Also, the flexible skin over the hinged elements will generally act to provide a restorative force that returns the elements to a planar state when the current through the SMA is turned off.

[0055] FIGS. **9** and **10** show a cross section of one pivoting element of FIG. **8** and further includes the illustration of the flexible skin structure **320** and further shows a pivoting element **808** in both an activated state (FIG. **10**) where the flexible skin structure is raised, and an inactive state where the flexible skin structure **320** is flat (FIG. **9**). As such in this example, the flexible skin structure **320** has pockets corresponding to desired texture features that are molded into the reverse surface or under surface thereof and bonded to a portion of the housing or other substructure within the device as noted above. A series of pivoting elements **802-808** underneath the flexible skin structure are connected, in one example, via a single length of shape memory alloy such that in a neutral position, the pivoting elements lie flat. When an electric current is run through the shape memory alloy, its length shortens by, for example, approximately 5% or any other length depending upon the type of shape memory alloy, and causes the pivoting elements to rise up and push against the flexible skin structure causing the appearance of a bump. When the electrical current is no longer applied, the flexible skin structure and underlying pivoting element returns to the neutral position due to tension in the flexible skin.

[0056] In another embodiment shown in FIG. **10***b*, a second series of pivoting elements **1002**, as part of a hinge lock structure, may be introduced beneath the first series of pivotal elements **806**, **808** to act as locks. When the first series of hinged elements **806**, **808** are actuated, the second series of pivoting elements **1002** are positioned so as to fall in to gaps **1000** created by the motion of the first set of pivoting elements thereby locking them into the raised position or to simply position underneath the first pivotal elements. It will be recognized that any other location may also be used or that any other suitable technique may be employed. When the electric current applied to the corresponding shape memory alloy element **812** that moves the first set of hinged elements **808** is stopped, the locking action of the second set of elements **1002** holds the first pivoting elements **806**, **808** in place by a biasing element **1006** pulling the elements **1002** under the elements **808**. By applying an electric current to a shape memory alloy